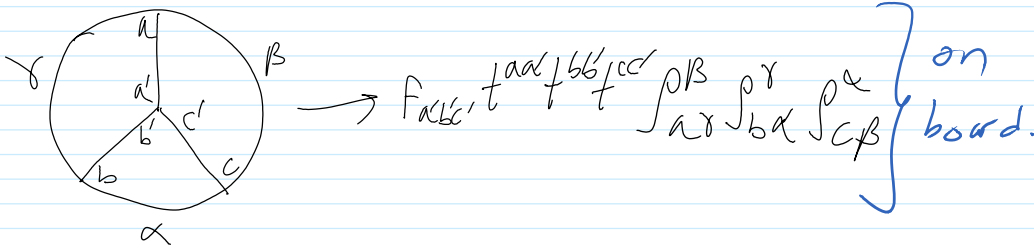


Grade HW5, Finalite & print soln page.
 HW6 due.
 Write HW7.



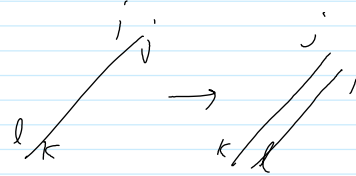
The gl_N calculation $a \leftrightarrow (ij)$

$$X_{ij} = i \binom{j}{i} \quad X_{ij} X_{kl} = \delta_{jk} X_{il}$$

$$[X_{ij}, X_{kl}] = \delta_{jk} X_{il} - \delta_{il} X_{kj}$$

$$t_{(ij)(kl)} = \text{tr } X_{ij} X_{kl} = \delta_{jk} \delta_{il}$$

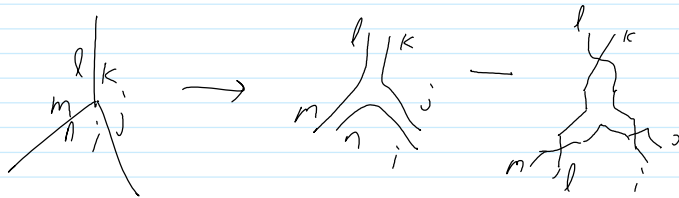
$t_{(ij)(kl)} = \text{same}$, indeed



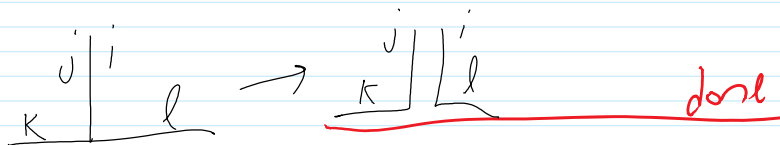
$$t_{ij,kl} t^{kl,mn} = \sum_{k,l} \delta_{jk} \delta_{il} \delta^{kn} \delta^{lm} = \delta_{jn} \delta_{im}$$

$$F_{ij,kl,mn} = \langle [X_{ij}, X_{kl}], X_{mn} \rangle = \langle \delta_{jk} X_{il} - \delta_{il} X_{kj}, X_{mn} \rangle$$

$$= \delta_{jk} \delta_{lm} \delta_{in} - \delta_{il} \delta_{jm} \delta_{kn}$$



$$r_{(ij)k}^l = \delta_{jk} f_i^l$$



Then bi-algebras & Milnor-Moore. } only sketched.